

XII.—*Excerpta Botanica, or abridged Extracts translated from the Foreign Journals, illustrative of, or connected with, the Botany of Great Britain.* By W. A. LEIGHTON, Esq., B.A., F.B.S.E., &c.

No. 2. *On the mode of Growth of the Ophioglosseæ.* By ALEX. BRAUN. (Ann. des Sc. Nat. n. s. xiii. p. 63.)

THE cellular body from which, in the genus *Ophioglossum*, the leaves arise, is not a sheathing leaf, nor of the nature of a stipule or a ligule; but is, in reality, a cellular body enveloping the centre of development, on the *exterior* of which centre the leaves are arranged in a regular spiral order, and in which situation they continue until their expansion, which, in *Ophioglossum vulgatum*, takes place in the fourth year. In this body each leaf occupies its own particular cellule, which, enlarging with the growth of the leaf, is in succession elevated into a conical form and becomes finally ruptured like a sheath. The spike in *Ophioglossum* is axillary, and is the solitary leaf of a bud developed in the axil of the sterile leaf, to the stalk of which that of the spike is agglutinated. In the genus *Botrychium*, at least in the advanced state in which alone it has been hitherto examined, this enveloping cellular body does not exist, but the leaves ensheath each other. M. Braun considers the cellular body in *Ophioglossum* as a thalloid formation remaining during the entire life of the plant, and correspondent to the cellular organ through which the primary leaves of germinating ferns penetrate, and to which the name of *proembryo* has been given. As in the Phanerogamæ the first commencement of a plant gives birth to a leaf developing itself in the interior of a cellular organ (the *sac embryonnaire*), so it would appear that throughout the whole vegetable kingdom the formation of a thallus precedes the formation of leaves.

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The osseous frame-work of the fin of the Ichthyosaurus, Mr. Owen observes, having alone been the subject of direct examination, the exact shape and the nature of the soft parts had been matters of conjecture. A very striking deviation from the reptilian and mammalian types had, indeed, been recognised, and resemblance also to

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Sir Philip Grey Egerton in a recent examination of *Ichthyosaurian* remains in the possession of Mr. Lee of Barrow-on-Soar, detected, with the penetration which has enabled him to bring to light many other obscure points in the structure of the *Ichthyosaurus*, traces of the soft parts of the fin in a slab of lias containing a mutilated paddle; and having submitted the specimen to the examination of Mr. Owen, a detailed account of its character forms the subject of this memoir.

Mr. Owen considers the specimen to be a posterior fin of the *Ichthyosaurus communis*. It presents impressions and fractured portions of six digits, with the impression,—and a thin layer, most distinctly preserved,—of the dark carbonized integument of the terminal half of the fin, the contour of which is thus most beautifully defined.

The anterior margin is formed by a smooth unbroken well-marked line, apparently a duplication of the integument; but the whole of the posterior margin exhibits the remains and impressions of a series of rays by which the fold of the integument was supported. Immediately posterior to the digital ossicles, is a band of carbonaceous matter of a distinctly fibrous structure, varying from two to four lines in breadth, and extending in an obtusely-pointed form for an inch and a half beyond the digital ossicles. This band Mr. Owen believes to be the remains of the dense ligamentous matter which immediately invested the bones of the paddle, and connected them with the enveloping skin. The rays, above-mentioned, are continued from the posterior edge of this carbonized ligamentous matter, in which their bases appear to have been implanted, to the edge of the tegumentary impression; the upper rays being directed transversely, but the others gradually lying more in the direction of the axis of the fin, as they approach its termination. The most interesting feature in these rays, Mr. Owen says, is their bifurcating as they approach the edge of the fin.

From the rarity of their preservation, their appearance and co-existence in the present instance with remains of the integument, he states, it is evident they were not osseous, but probably either cartilaginous, or of that albuminous horn-like tissue, of which the marginal rays consist in the fins of the sharks and other plagiotomous fishes. Besides the impression of the posterior marginal rays, the specimen presents a series of fine, raised, transverse lines, which cross the whole fin, and probably indicate a division of the rigid integument into scutiform compartments, analogous to those

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In conclusion, Mr. Owen remarks, that the other new facts presented by the specimen, accord with the indications of the natural affinities of the Ichthyosauri afforded by their less perishable remains ; and that all the deviations from the reptilian structure of the skeleton tend to the type of fishes and not to that of cetaceous remains.

Dec. 18, 1839.—A paper was first read, entitled “ Description of the fossil remains of a mammal, a bird, and a serpent, from the London clay,” by Richard Owen, Esq., F.R.S., F.G.S.

The author commences by observing, that only a few months had elapsed since the highest organic animal remains known to exist in the London clay were those of reptiles and fishes ; and that the danger of founding conclusions in Palæontology from negative evidence was perhaps never more strikingly illustrated than by the fact, that the first scientifically determined relic of a warm-blooded animal from that formation proved to belong to the highest order of that class, if man be excepted ; and that besides those quadrumanous remains, there have since been discovered in the London clay underlying the coralline crag, near Kyson, in Suffolk, teeth of cheiroptera, and of a species probably belonging to the marsupial order*.

Mr. Owen then proceeds to describe the fossils, the immediate objects of the communication.

I. The portion of the mammal was discovered by Mr. Richardson in the cliffs of Studd Hill, near Herne Bay, and belongs to a new and extinct genus of Pachydermata. It consists of a small mutilated cranium about the size of that of a hare, containing the molar teeth of the upper jaw nearly perfect, and the sockets of the canines. The molars are seven in number on each side, and resemble more nearly those of the *Chæropotamus* than of any other known genus of existing or extinct mammalia. They present three distinct modifications of the grinding surface, and increase in complexity from before backwards. The first and second spurious molars have simple sub-compressed crowns, surmounted by a single median conical cusp, with a small anterior and posterior tubercle at the outer side, and a ridge along the inner side of its base. They are separated by an interspace nearly equal to the antero-posterior diameter of the first molar. The second and remaining molars are in close juxtaposition. The third and fourth molars form the principal difference between the dentition of the present genus and that of the *Chæropotamus*, being larger and more complex in the grinding surface. They

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present a sudden increase in size and change of form. The plane of the crown is triangular, with the base outwards, and the posterior and inner side convex: it supports three principal cusps, two on the outer, and one on the inner side; there are also two smaller elevations with a depression on the summit of each, situated in the middle of the crown, and the whole is surrounded with a ridge which is developed into a small cusp at the anterior and external angle of the tooth. The three true molars closely correspond with those of the *Chæropotamus*. The sockets of the canines indicate that these teeth were relatively as large as in the peccari.

The bones of the head are separately described: the palatal processes of the maxillary bones are shown to be rugous, as in the peccari; the eye to have been full and large, as indicated by the size of the optic foramen and the capacity of the orbit, equalling an inch in vertical diameter: the general form of the skull is described as partaking of a character intermediate between that of the hog and the hyrax, though the large size of the eye must have given to the physiognomy of the living animal a resemblance to that of the *Rodentia*.

These indications, Mr. Owen says, scanty though they be, of the form of a species nearly allied to the *Chæropotamus*, are extremely interesting, on account of the absence of similar information regarding that genus. The resemblance of the molar division of the dental system in the new genus, for which the name of *Hyracotherium* is proposed, and the *Chæropotamus*, is sufficiently close to warrant the conclusion, that the canines and incisors if not similar would differ only in form and proportion; and that hence it may be ventured to solve analogically some of the doubts entertained by Cuvier respecting the dental characters of the *Chæropotamus*, and to affirm confidently that it had canines in the upper as well as the lower jaw. The incisor teeth with the *ossa intermaxillaria* are wanting in the specimen of the *Hyracotherium*, and have not been found in any fragment of the *Chæropotamus*.

2. The remains of birds described in the paper consist of a sternum, with other bones, and a sacrum, the former belonging to the collection of the late John Hunter, in the Royal College of Surgeons, and the latter to the cabinet of Mr. Bowerbank. Both the specimens were obtained from Sheppey. The Hunterian fossil includes the sternum nearly entire, the proximal ends of the coracoid bones, a dorsal vertebra, the distal end of the left femur, the proximal end of the corresponding tibia, and a few fragments of ribs. Mr. Owen first shows, in approximating to which of the three great groups of birds, terrestrial, aerial, or aquatic, the *Ornitholite* belonged, that from the length of the sternum and the remains of the primary intermuscular crest or keel, it could not have been a strictly terrestrial bird, though these characters do not prove that it was a bird of flight, as they occur in the Penguins or other *Brachyptera*, which have need of muscular forces to work their wings as paddles under water. In the present fossil, however, from the lateral extent and convexity of the sternal plate, the presence and course of

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the secondary intermuscular ridges, the commencement of the keel a little way behind the anterior margin of the sternum, Mr. Owen says there is no affinity with the brachypterous family. The coracoid bones or posterior clavicles, he also shows are less available in determining the habits of the Ornitholite, as they relate much more closely to the respiratory actions than to the movements of the wings, and are strongly developed even in the Apteryx. There remained consequently for comparison the ordinary birds of flight; and of these, the native species, which resemble the fossil in size, first claimed Mr. Owen's attention. Though the sternum is not complete, yet sufficient remains to have enabled him to set aside the Gallinaceous, and those Grallatorial and Passerine birds which have deeply incised sternums, and to restrict the field of comparison to such species as have the sternum either entire, or with shallow posterior emarginations. After a rigid comparison of the minor structural details and pursuing it from the sea gulls and other aquatic birds upwards through the Grallatorial and Passerine orders, omitting few British species, and no genus, he at length found the greatest number of correspondences in the skeleton of the accipitrine species. The resemblance, however, was not sufficiently close to admit of the fossil being referred to any native genus of Raptores: the breadth of the proximal end of the coracoid removes it from the owls (*Strigidae*), the shaft of the same bone is too slender for the Falconidæ; and the femur and tibia are relatively weaker than in many of the British Hawks or Buzzards. It is with the Vultures that Mr. Owen has found the closest agreement; but he says the fossil indicates a smaller species than any known to exist in the present day, and is probably a distinct subgenus.

The professed ornithologist, Mr. Owen remarks, may receive with reasonable hesitation a determination of family affinities arrived at, in the absence of the usual characters deduced from the beak and feet; but in the course of a long series of close comparisons, he says, he has met with so many more characters, both appreciable and available in the present problem, than he anticipated, that he confidently expects, in the event of the mandibles, the bones of the feet, or the entire sternum of the bird in question being found, they will establish his present conclusion, that the Sheppey ornitholite is referrible to a member of the group of Accipitrine Scavengers, so abundant in the warmer latitudes of the present world.

The Ornitholite in Mr. Bowerbank's museum consists of ten sacral vertebræ anchylosed together, as is usual in birds with a continuous keel-like spinal ridge. Four of the vertebræ are analogous to the lumbar vertebræ in the mammalia, and they are succeeded by five others, in which, as in the Vultures, the inferior transverse processes are not developed. This character, however, Mr. Owen says, is not peculiar to the Vulturidæ. Though the part of the fossil preserved is eminently characteristic of the class of birds, yet it is not calculated to throw light on the closer affinities of the species to which it belongs: nevertheless it supports rather than affects the determination of the Hunterian specimen. For the apparently ex-

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inct bird indicated by these fossils, the name of *Lithornis vulturinus* is provisionally proposed.

3. Mr. Owen commences his description of the remains of an extinct species of Serpent found at Sheppey, by pointing out the essential characters by which the vertebræ of an Ophidian Reptile are distinguished.

Vertebræ joined enarthrodially by a deep anterior transversely oblong cup and a corresponding prominent posterior ball, and further articulated by projecting posterior oblique processes, wedged like the carpenter's tenon into a mortice, excavated in the anterior oblique processes of the succeeding vertebra, supporting moreover on each side of the fore part of the body an oblong convexity for the moveable articulation of the rib, can belong, Mr. Owen observes, to no other than a reptile of the Ophidian order.

One of the specimens described in this portion of the memoir, consists of about 30 vertebræ possessing the above characters; also of a number of long slender ribs, having expanded concave vertebral extremities cemented irregularly together by a mass of indurated clay, and it forms part of the Hunterian collection of fossils; another specimen, consisting of 28 vertebræ, and some others of less magnitude, belong to Mr. Bowerbank's collection. All the specimens, Mr. Owen considers, are referrible to the same species, and they were all found at Sheppey.

The vertebræ in each specimen present the same conformation, and nearly the same size, being equal in this respect to those of a Boa Constrictor 10 feet long. They belong to the ordinary dorsal or costal series, and differ from those of the Boa and Python in their superior length as compared to their breadth and height. The ridge continued from the anterior to the posterior oblique processes on each side is less developed: the oblique processes themselves do not extend so far outwards; and the spinous process is narrower in its antero-posterior extent but longer. In the first two of these differences, the fossil agrees with the Linnæan Coluber and its subgenera, but differs from the Crotalus; and in the remaining points it differs from Crotalus, Coluber, Naja and Trionocephalus. The long and comparatively narrow spine, the outward prolongation of the upper angle of the posterior oblique processes, the uniform convexity of the costal protuberance, the uneven or finely wrinkled external surface of the superior arch of the vertebra, are characters which distinguish these Ophidian vertebræ from those of any other genus of the order with which Mr. Owen has been able to compare them. He therefore proposes to call the species provisionally *Palæophis To-liapicus*.

The ribs are hollow as in all land serpents.

From the agreement in the configuration of the under surface of the body of the vertebræ of the fossil with that in the vertebræ of the Boæ and Pythons more nearly than with the Colubri, and in none of the differences above noticed indicating any obstacle to the entrapping and destroying a living struggling prey, as well as from the length (11 feet) which it may be inferred the creature attained,

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Mr. Owen concludes it was not provided with poisonous fangs. Serpents of similar dimensions exist in the present day only in tropical regions, and their food consists principally of the warm-blooded animals. Mr. Owen therefore in conclusion states, that had no evidence been obtained of birds or mammals in the London clay, he would have felt persuaded that they must have coexisted with the *Palæophis Toliapicus*.

ZOOLOGICAL SOCIETY.

December 10, 1839.—William H. Lloyd, Esq., in the Chair.

A letter from Dr. Weissenborn, dated Weimar, October 6, 1839, was read. It accompanied a present of two specimens (male and female) of the black variety of the common Hamster (*Cricetus vulgaris*), and a head, preserved so as to display the cheek-pouches of that animal. The writer of the letter states that he possesses a common Pigeon, just fledged, in which no vestiges of the organs of vision can be traced. "The orbits are tolerably well developed, and lined with a sort of half-mucous membrane, and therefore destitute of feathers. I have never heard of a similar defect in any animal; and in one where the incubation is extra-uterine it appears doubly wonderful or anomalous. The bird is quite healthy, and presents in its habits several curious anomalies, which may be traced to its monstrosity."

Professor Owen communicated his notes on the Anatomy of the Biscacha (*Lagostomus trichodactylus*, Brookes).

"The individual dissected," says Mr. Owen, "was a female, full-grown, weighing 8 pounds 2 ounces, avoirdupois: the weight of the brain was 5 drachms, avoirdupois, the proportion of the brain to the body being as 1 to 416. This is the smallest relative size of the brain that has yet been recorded in the Rodent order, in some of the species of which order, as the Mouse, the brain approaches that of Man, the relation of its mass to that of the body being as 1 to 46; that of the human subject is as 1 to 30. The brain presented the usual broad depressed form and simple unconvoluted surface characteristic of the Rodent order: its length was 1 inch 8 lines, its breadth 1 inch 5 lines, and the length of the cerebral portion 1 inch 3 lines. The proportion of the cerebellum to the cerebrum was as 1 to 5. The breadth of the *medulla oblongata* was to that of the *cerebrum* as 1 to 6. The upper surface of each lobe of the cerebrum is marked with two slightly curved fissures, each between 3 and 4 lines in length, and one a little in advance of, and exterior to the other: a single anfractuosity defines the external convex prominence of the cerebrum. On the under surface a fissure is continued from the posterior part of the cerebral hemisphere forwards, along the middle of the natiform protuberance, to the outer boundary of the root of the large olfactory nerve.

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December 10, 1839.—William H. Lloyd, Esq., in the Chair.

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Professor Owen communicated his notes on the Anatomy of the Biscacha (*Lagostomus trichodactylus*, Brookes).

"The individual dissected," says Mr. Owen, "was a female, full-grown, weighing 8 pounds 2 ounces, avoirdupois: the weight of the brain was 5 drachms, avoirdupois, the proportion of the brain to the body being as 1 to 416. This is the smallest relative size of the brain that has yet been recorded in the Rodent order, in some of the species of which order, as the Mouse, the brain approaches that of Man, the relation of its mass to that of the body being as 1 to 46; that of the human subject is as 1 to 30. The brain presented the usual broad depressed form and simple unconvoluted surface characteristic of the Rodent order: its length was 1 inch 8 lines, its breadth 1 inch 5 lines, and the length of the cerebral portion 1 inch 3 lines. The proportion of the cerebellum to the cerebrum was as 1 to 5. The breadth of the *medulla oblongata* was to that of the *cerebrum* as 1 to 6. The upper surface of each lobe of the cerebrum is marked with two slightly curved fissures, each between 3 and 4 lines in length, and one a little in advance of, and exterior to the other: a single anfractuosity defines the external convex prominence of the cerebrum. On the under surface a fissure is continued from the posterior part of the cerebral hemisphere forwards, along the middle of the natiform protuberance, to the outer boundary of the root of the large olfactory nerve.

"On laying open the abdomen an immense accumulation of adipose membrane concealed the viscera; the bag of the great omentum

formed, however, a small part of this covering, as after extending down over half the abdomen it was reflected upwards, in front of the liver. The lower half of the abdominal cavity was overlapped by broad and thick adipose processes, continued from the lower convolutions of the colon, without being connected with the great omentum, and from the fundus of the urinary bladder. The *appendices epiploicæ* of the human colon may be regarded as rudimentary conditions of the adipose folds here so enormously developed. The stomach corresponded in form and relative size with that of the *Chinchilla* (see Trans. Zool. Soc., vol. i. p. 51. pl. V.). The left blind extremity projected about an inch beyond the cardia; the pyloric end became suddenly contracted: the cuticular lining of the œsophagus terminated at the cardia in five pointed processes, radiating from the cardia.

"The duodenum was dilated, as in many other phytophagous Rodents, at its commencement; it descends with a slight sigmoid flexure to the right lumbar region, then crosses over to the left side, being freely suspended in a broad duodenal mesentery, which contracts as the gut perforates the base of the meso-colon to become the jejunum. The small intestines presented the usual disposition: the cæcum is of moderate length, viz. four inches, with a diameter of two and a half inches, thus corresponding in general form with that of the *Chinchilla*. The colon first crosses obliquely the lower part of the abdomen, and returns, forming a fold of about four inches in extent; it then describes a second much larger and narrower fold, of ten inches in length: it is at the bend of this fold that the fæces begin to be separated into pellets, and it is from these loops that the omental processes are continued: the colon then bends over the root of the mesentery, passing below the stomach to the left side of the abdomen, where it describes a series of convolutions before ending in the rectum. No omental process is continued from these folds, but the meso-colon, to which they are suspended, is of great breadth, and was loaded with fat.

	Feet.	Inches.
Length of the small intestines	14	9
————— large ditto	7	5

"The anal, vaginal, and urethral outlets are separate from one another.

"The liver consists of a left lobe, a cystic lobe, and two small right lobes, with a spigelian appendage. The cystic lobe is fissured, and the left division is perforated on its free convex surface to receive a process of the suspensory ligament.

"The gall-bladder was of very small size.

"The spleen is triangular, with the upper or anterior angle most produced.

"The kidneys and suprarenal glands as usual in Rodents. The heart presented the usual form; two superior venæ cavæ, the left joining the inferior cava, and receiving the coronary vein. The

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right lung presented three lobes and the median lobule; the left lung three lobes.

"There was nothing remarkable in the ovaria or fallopian tubes. The two uteri terminate by distinct valvular orifices; they are long and narrow: in each mesometry there is a plexus of transversely disposed vessels, principally veins, which runs parallel with the uterus, and seems to represent the remains of the wolffian body. The most interesting feature in the generative organs was a longitudinal septum, dividing the vagina into two canals for upwards of an inch beyond the *ora tinca*. This septum terminated by a thin concave edge, directed towards the outlet of the vagina. There was no constriction or valvular fold between the divided and the undivided portions of the vagina; the former were somewhat more vascular, and slightly plaited longitudinally. The whole length of the vagina was four inches. The clitoris was perforated by the urethral canal, and was nine lines in length.

"No other placental quadruped has hitherto presented so near an approach to the marsupial type of the female organs as the *Lagostomus*. Rudiments of a vaginal septum occur in the young or virgin state of several genera; but it is only in the *Lagostomus* that a continuation of the median separation of the genital tubes has been continued beyond the uterine portion along so great an extent of the vagina, and as a permanent structure."

Professor Owen also communicated the following paper, entitled "Observations on the Generative System of some of the lower Animals," by Professor Rudolph Wagner, M.D.

"Among a variety of observations which I undertook on the coast of Nice in August and September 1839, for the purpose of obtaining a more intimate knowledge of the anatomy and physiology of marine animals, there are several which perhaps afford some more general interest for the natural history of animals.

"Many of my own earlier observations had produced the conviction, that a disjunction of the sexes is much more universal than has been hitherto admitted. Cuvier, in his 'Règne Animal,' and after him the most of those who have entered upon Zoological Classification, still assume that among the so-called lower animals many are no more than females, and others without sex.

"Thus, to begin with the *Mollusca*, and judging from assertion, the *Cyclobranchiata* up to the present time are known only as females. I succeeded as well in *Patella* as in *Chiton* in finding some individuals that were males, and others that were females. The males have a white testis, with active spermatozoa, resembling those of muscles; the females have all the elements of the primitive ovum. The *Ascidie* also appear to be of disjoined sex. I found, however, in several species merely ova, but ova that presented the germinal vesicle and germinal spot.

"Among the *Radiata* I had hitherto found only females, as well in the Starfish as in the Sea-urchin and the *Holothurie*. The pear-

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"Regarding the *Medusæ*, Von Siebold of Dantzic had already mentioned that he had found male individuals with spermatozoa in *Medusa aurita*. In Nice I convinced myself with the greatest certainty in *Pelagia*, *Aurelia*, *Cassiopeia*, and a fourth genus, that these *Medusidæ* are always of disjoined sex. The males, with their spermatozoa actively moving (even within the capsules of the testes), are at the first glance to be distinguished from the females, whose ovaria always contain ova in different stages of development*.

"It is of especial interest to find that a disjunction of sex admits of demonstration, even in the *Polyps*. One of my companions, Dr. Erdl, (?) of Munich, found in *Veretillum* only female individuals in one *Polypary*, and in others only males. He writes me that he has afresh convinced himself of the same relation in *Alcyonium*, though the specimen had been preserved in spirit; and that among the *Mollusca* he has found similar sexual differences in *Halyotis*; thus in the *Aspidobranchia* of Cuvier.

"I must here remark, that my earlier statements on the spermatozoa of the *Actiniæ* are erroneous, since I regarded entirely peculiar and remarkable capsules with long threads (situated even on the prehensile arms) as spermatozoa.

"My researches on the spermatozoa of cartilaginous fishes have shown the remarkable fact that the individual genera of the Rays and Sharks are distinguishable by the form of their spermatozoa. These spermatozoa are for the most part spirally wound, as in birds of song. Very remarkable is the structure of the testis; which is constantly connected with a largely developed and winding *vas deferens*. That which Johann Müller has described in the Rays as a peculiar gland is nothing else than this *vas deferens*. The relations in form of the male genital organs alternate much, as I shall show in a special and more comprehensive work.

"The facts here reported were not witnessed by myself alone, but also by Professor Valentin of Bern, Dr. Peters of Berlin, and five young zootomists, pupils of mine, who were all in Nice at the same time as myself, and took a part in my observations."

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